

Division of Capital Asset Management and Maintenance



Leading By Example and Accelerated Energy Program Meeting

March 11, 2014

Agenda

- Welcome & Introductions
- State Policy Updates
- Outreach
- AEP Updates
- LBE Clean Energy Grants
- LBE Progress Data
- NESEA Highlights
- Middlesex CC GSHP Highlight and Tour



State Policy Update: Commercial Organics Ban

- Final regulations published in January
<http://www.mass.gov/eea/agencies/massdep/recycle/solid/massachusetts-waste-disposal-bans.html>
- Ban will go into effect in October 2014
- Applies to businesses/institutions that dispose of one ton or more per week in trash
- For assistance, contact RecyclingWorks @ 888-254-5525 or info@recyclingworksma.com
<http://www.recyclingworksma.com/commercial-organics-waste-ban/>



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Creating A Cleaner Energy Future For the Commonwealth

State Policy Update:

Energy Resiliency for Climate Adaptation

- **\$40 million grant program**
- Support municipal efforts to harden critical energy services using clean energy technology
- Targeting critical facilities:
 - Life safety (police, fire, hospital, wastewater treatment, and shelters)
 - Lifeline resources (food supply, communications, transportation)
 - Community Resources (town halls, senior centers, schools, multi-family housing facilities capable of sheltering)
- Additional \$10 million infrastructure repairs



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State Policy Update:

Energy Resiliency for Climate Adaptation

- Clean energy technologies include:
 - Distributed renewable energy generation (electric and heating/cooling systems) and energy efficiency
 - CHP/district energy systems
 - Energy storage (flywheels, batteries, electric vehicles, hot/cold water storage)
 - High efficiency fuel cells
 - Energy management and demand response systems
 - Advanced controls, switches, inverters and other grid stability technologies
 - Microgrids



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State Policy Update:

Solar PV – SRECs and Net Metering

- SREC II
 - Legislative committee commenting on SREC II
 - 30 days to file final regs after comment
 - Final regs could go into effect late April
- Net metering – 2 bills have been proposed
 - Solar industry – no caps through 2016 – creates committee for long-term solution
 - Utilities – competitive procurement for large-scale projects, keep caps



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State Policy Update: Pathways to Zero Grant Program Announcement

- \$3 million ACP Program
- To be launched in April 2014
- Program will fund:
 - Design and project grants for commercial, public, and residential zero net energy building projects
 - Workforce development, outreach, training, etc.
- Specifics of program will be finalized with input from EEA's ZNEB Advisory Council



Outreach Updates

🏠 Event Location Here

📅 Event Date Here

🕒 Event Time Here

ENERGY-SAVING LIGHTING FAIR

Hosted by:  Made Possible by: 

HOST LOGO 

Product selection and style is subject to change and availability; while supplies last. Sales tax is not included in pricing. Cash, check and charge accepted.

Mass Saver COMBO SPECIAL

Take the bite out of your electricity bill with this amazing deal.

SAVE BIG

(3) Dimmable 60w LED A19s only using 11w

(6) 60w Warm White Incandescent-Style CFL A19s only using 13w

(2) 60w Desk Lamps only using 13w (bulbs included)

\$10

Omni-Directional LED

75-watt Equivalent A19 - **\$8**

60-watt Equivalent Globe - **\$10**

40-watt Equivalent Candle - **\$10**

Energy Saving TrickleStrip

\$10

Did you know?
Electronic equipment uses power even when it is off! This power strip eliminates 'phantom' load.

Energy Conservation

Belkin Conserve Products **\$8 - \$40**

Evolve 1.5GPM Showerhead with Showerstart - **\$15** (Valve only - **\$11.50**)

Embertec Emberplug AV - **\$50**

Indoor Flood Lights

BR20 LED - **\$5**

BR30 LED - **\$5**

BR40 LED - **\$10**

- Lighting Fairs for employees through MassSave

Matt Ouellette, Techniart
C 860.830.9814

matt@techniart.com

- LBE Webinars:
 - *EEMS (April)*
 - *Renewable Thermal Technologies (May)*
- AEP energy efficiency “inreach” toolkit and discussion



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ACCELERATED ENERGY PROGRAM – LEADING BY EXAMPLE

MARCH 11, 2014

www.mass.gov/dcam/aep



Secretary Shor
Commissioner Cornelison



Governor Patrick



Secretary Sullivan
Commissioner Sylvia



Creating A Cleaner Energy Future For the Commonwealth

Program Goals & Partners



- **AEP Update**
- **Status and Accomplishments**
 - **Data Management**
 - **Towards Zero Net Energy**
 - **Labor and Workforce**

AEP Recognition

This quarter DCAMM and DOER recognize **Tom Mazzeo** from the Berkshire County Sheriff's Office as the AEP Spotlight Partner.



Tom has provided outstanding efforts on the AEP:

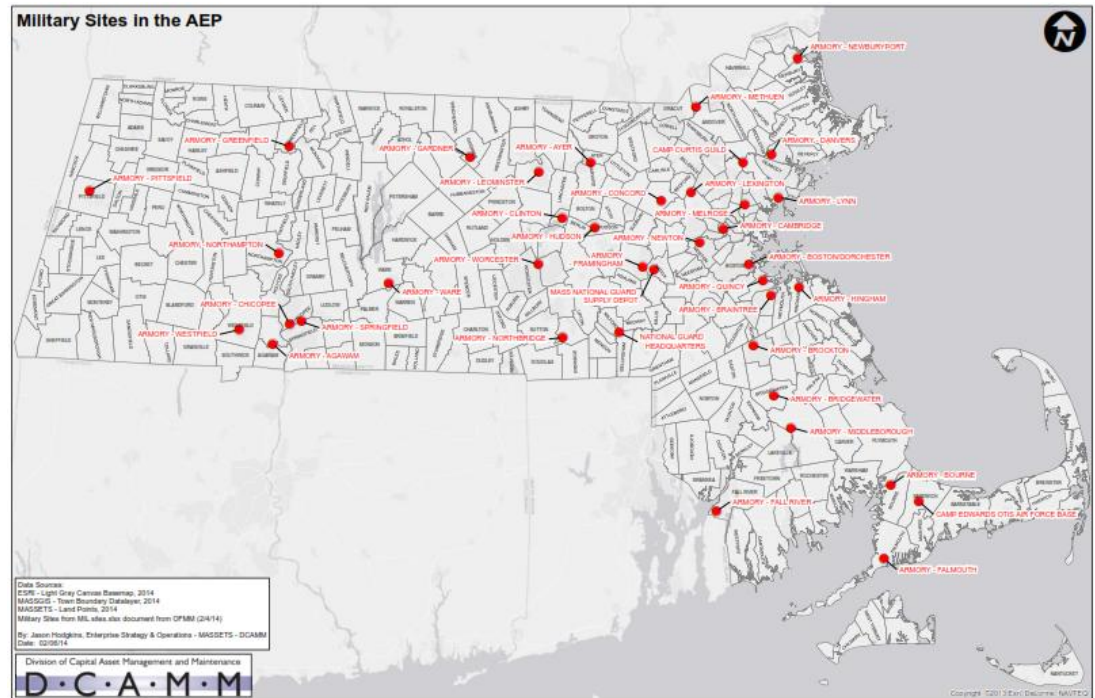
- Helped lead and implement a major energy efficiency and renewable energy project.
- Guided consultants through a complete energy assessment of the site.
- Assisted with developing an integrative design of three systems (condensing boilers, instantaneous hot water generation and solar thermal array) – 56% annual energy savings!

Thank you for your dedicated efforts!

AEP Recognition – Q4 2014 Spotlight Partner

Colonel Mark Murray, the State Quartermaster of the Massachusetts Military Division

- Helped DCAMM and its utility vendors to audit and install ECMs at 29 armories statewide.
- Proactively coordinated site visits, provided utility data, reviewed audit reports, processed utility incentive applications and coordinated construction.
- Has been invaluable in the improvement of energy efficiency of military sites during his tenure as Quartermaster



Thank you for your dedicated efforts!

Major Q2 2013 Accomplishments

Defined Approach for Towards Zero Net Energy (TZNE) Retrofits
Held an AEP Press Event
Significant Progress with Small Sites
Drafted In-Reach AEP Kit



The AEP TZNE charrette on September 13, 2013 brought together an integrated team of 74 people from various disciplines including architects, energy engineers and facility managers.

Major Q4 2013 Accomplishments

Significant Progress with Small Sites

Piloting TZNE Retrofits

Using Facility Energy Usage Information



Holyoke Community College is one of the eleven (11) sites where DCAMM is piloting a new and innovative approach to implementing TZNE retrofits.

Progress on Small Sites

In Q4 2013, DCAMM signed a new contract and issued a second bundle of sites to 3 companies:

- **ESCO** (*signed new contractor*) - Issued an initial bundle of DCR sites in Boston area.
- **Paquette** – Issued a second bundle of sites comprised of MASSDOT District 2 facilities.
- **Energy Conservation** – Issued a second bundle of sites comprised of DCR facilities in the south east region.
- **Source One** – Issued a second bundle of sites comprised of DCR facilities in the Boston area.

Utility Approved Vendor Status

12 Vendors

219 Sites Underway

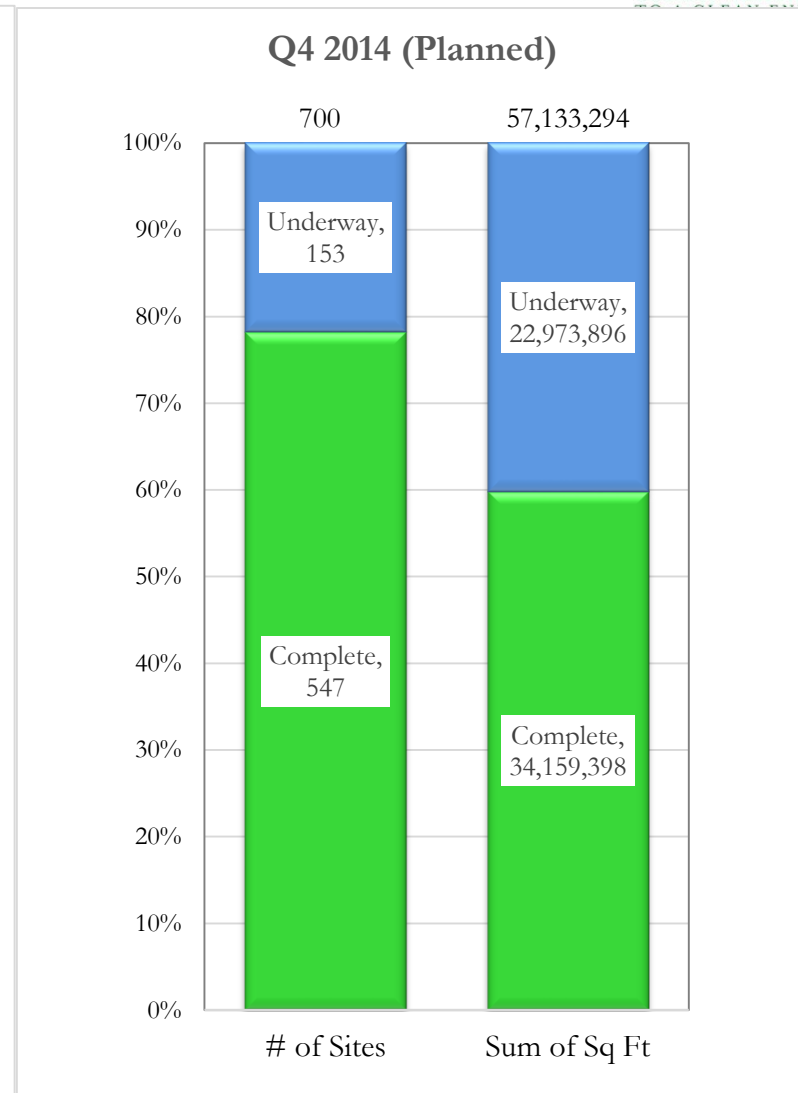
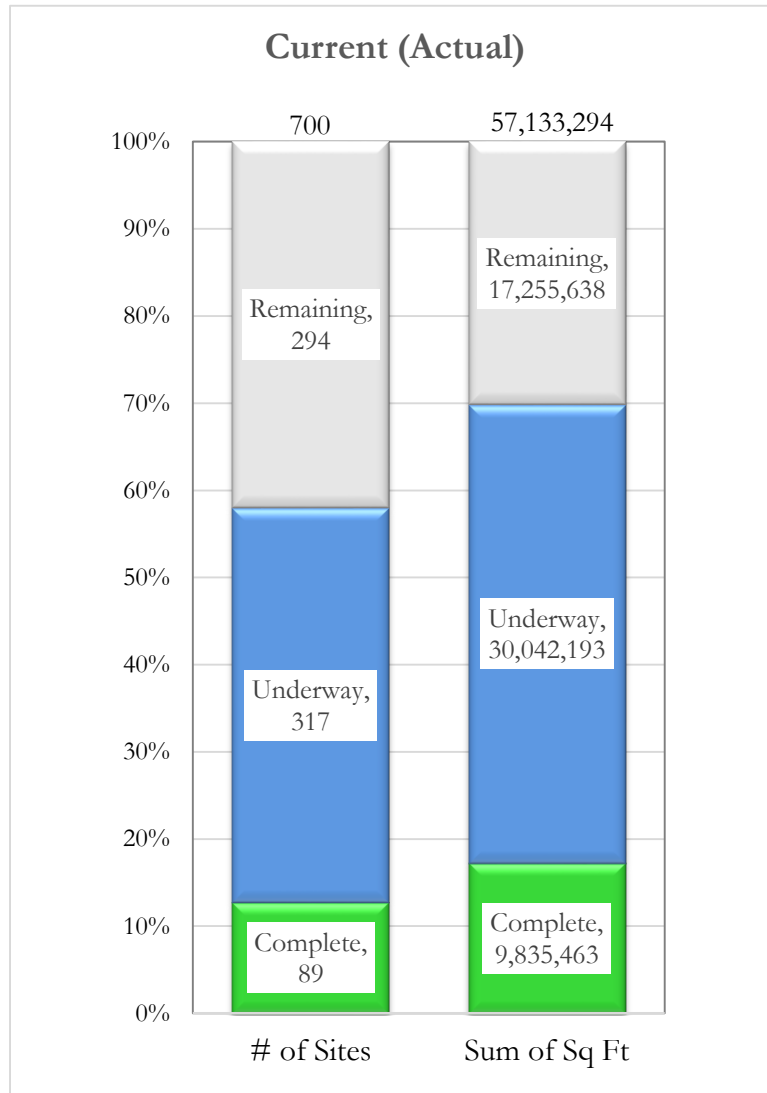
125 Audits Completed

31 Sites in Construction

5 Sites are Substantially Completed

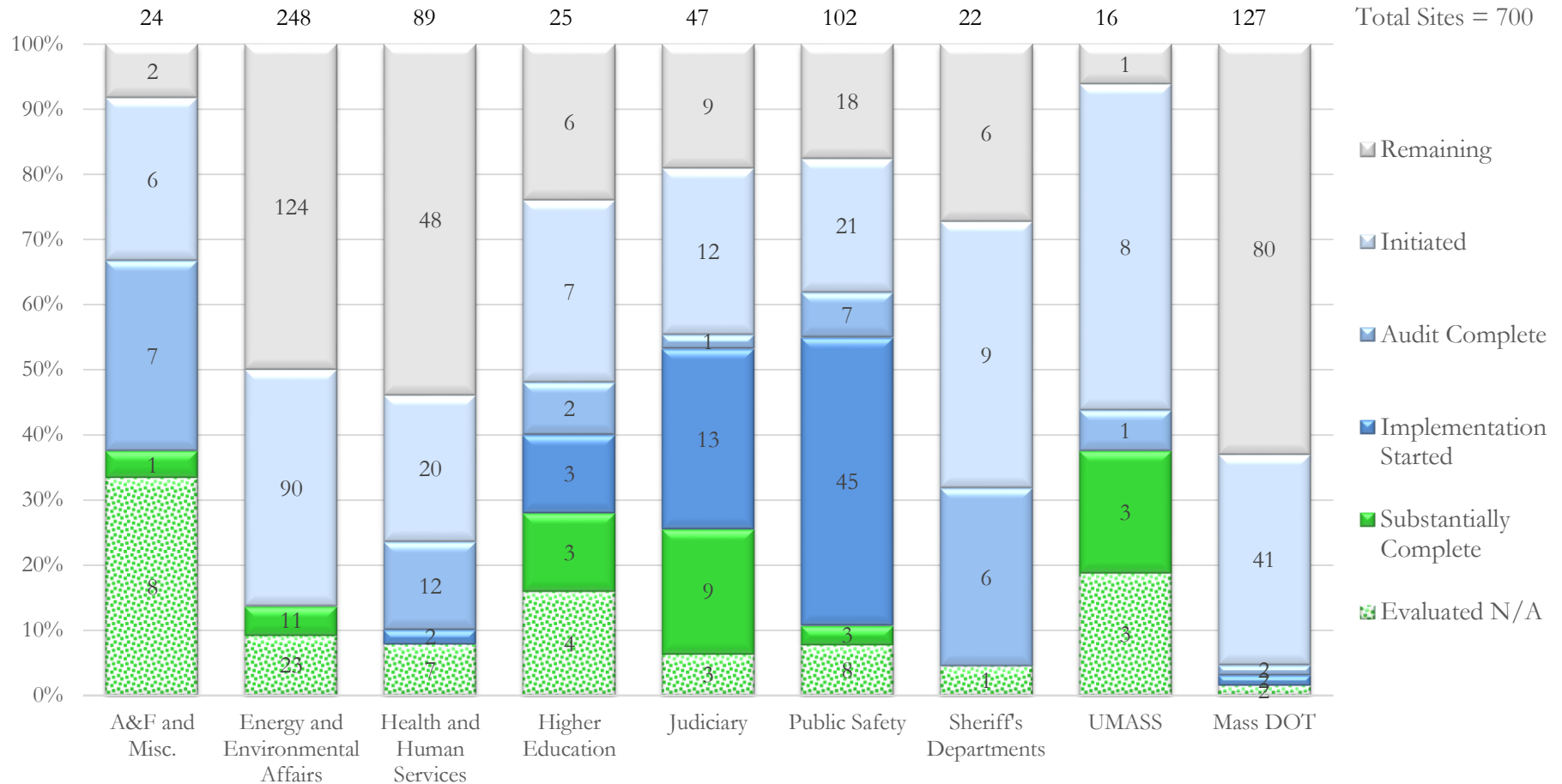
245 Sites Remaining

Program Status – Q4 2013



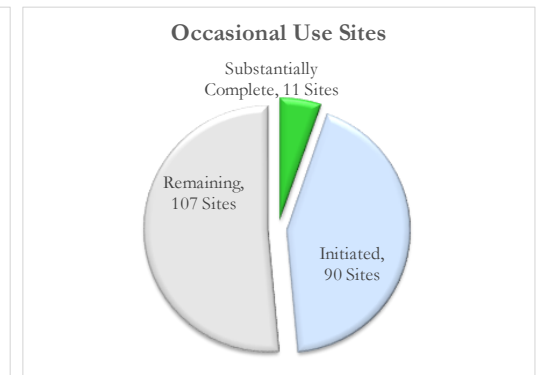
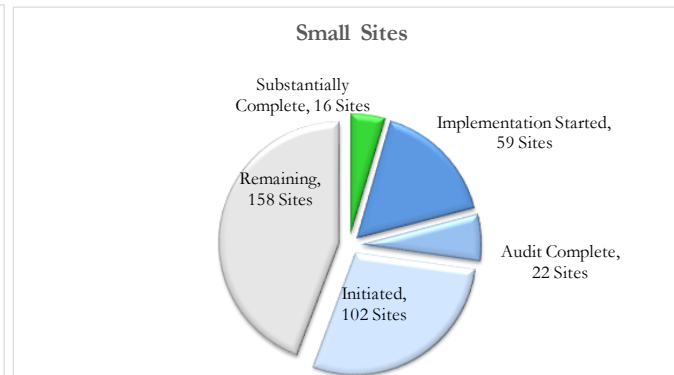
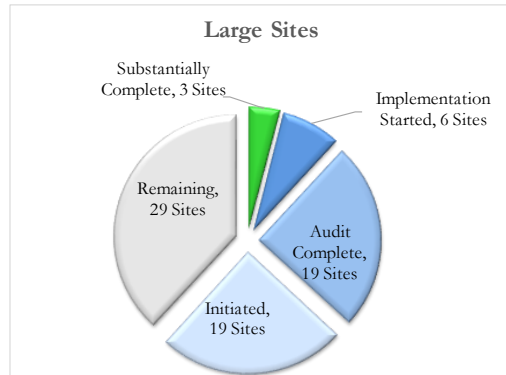
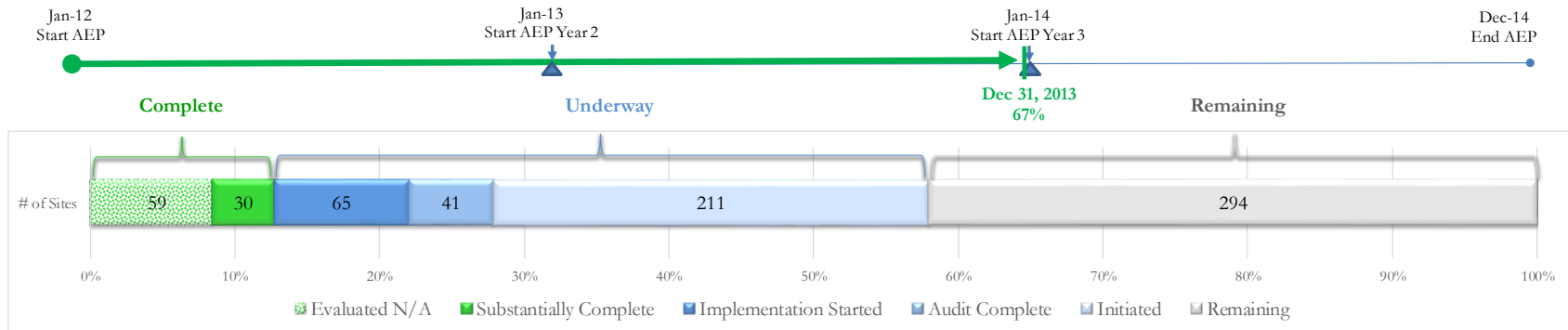
Program Status – Q4 2013

Site Status by Program Area

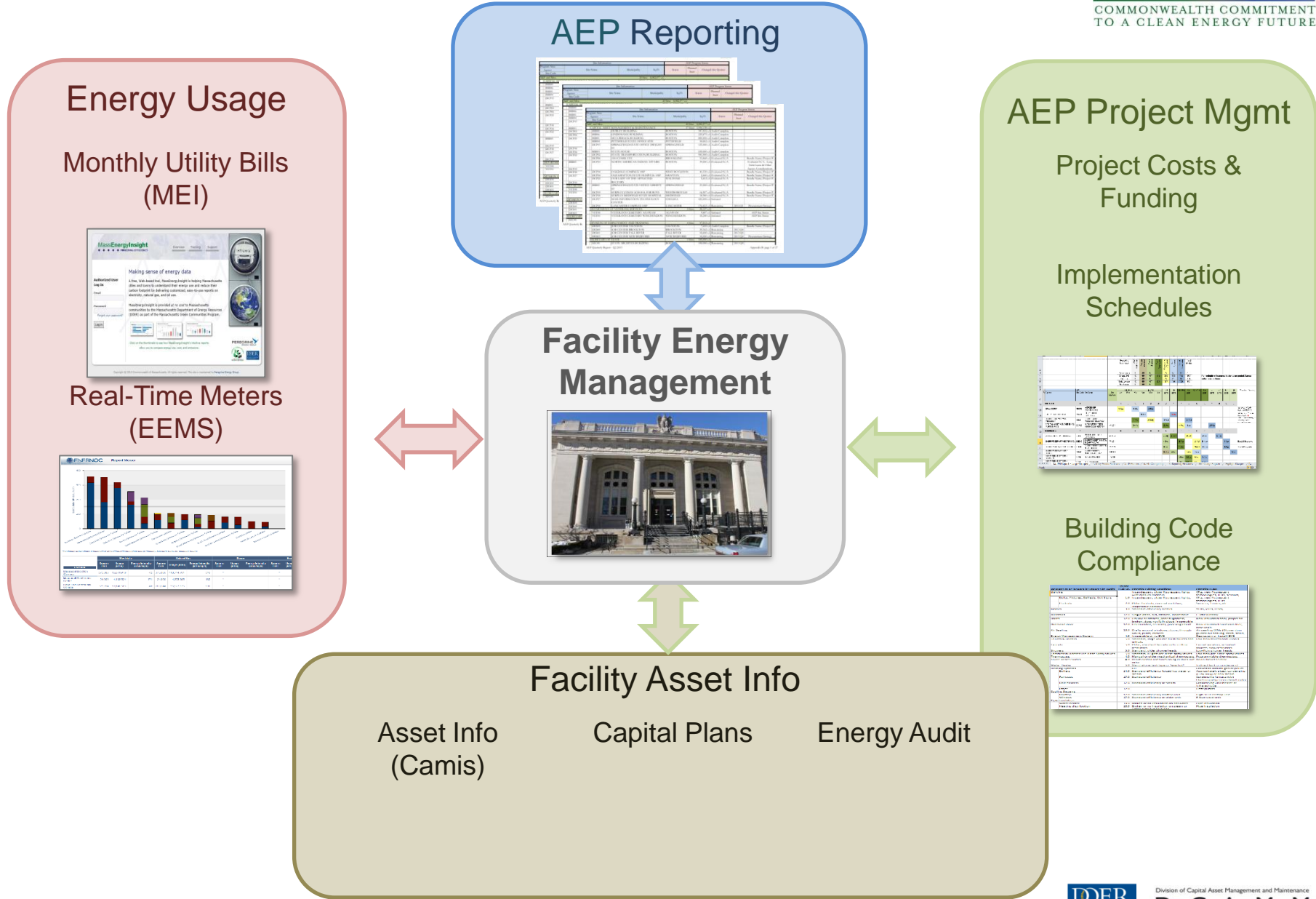


Detailed Program Status

AEP Status December 31, 2013



AEP Has Developed New Ways to Manage Energy Data



DCAMM Sites Mapped to Utility Accounts & MEI

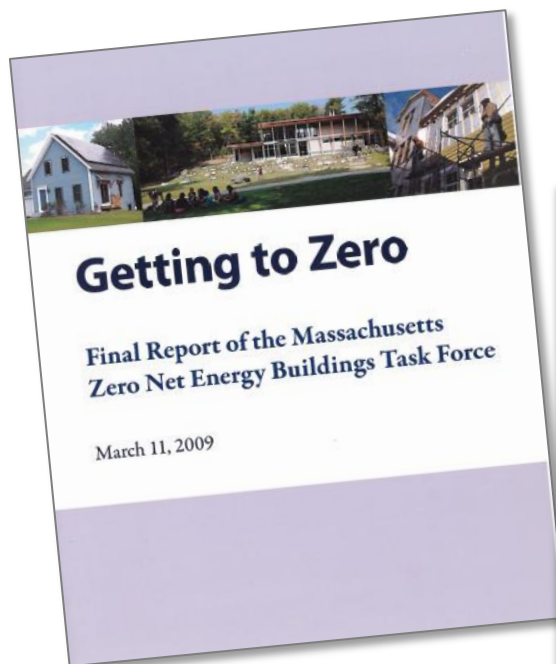
DCAMM Facility - Energy & Utility Accounts (E&UA) Report: January 10, 2014

Summary	Sites		E&UA		EEMS		Utility Accounts (MEI)			Audit Data				
	Total	Total SQFT	E&UA Sites	E&UA Sqft	EEMS Sites	EEMS Sqft	MEI Sites Mapped	MEI Sqft Mapped	MEI Accounts Mapped	Audit Sites	Sites With Utility Accounts	MEI Sites Mapped via Audits	Accounts Missing from MEI	MEI Accounts Mapped to Sites from Audits
AEP Sites	698	64,989,754	467	55,070,446	32	17,464,803	438	55,070,446	3,558	112	61	20	116	148
Non AEP Sites*	136	11,814,269	67	10,487,320	10	2,778,609	63	10,487,320	428					
									3,986					
Accounts Not Yet Mapped									4,566					
Total	834	76,804,023	534	65,557,766	42	20,243,412	501	65,557,766	8,552	112	61	20	116	148
<i>Percent of Total Sites</i>			64%	85%	5%	26%	60%	85%		16%	9%			

DCAMM and DOER mapped 534 sites representing 64% of the MEI account numbers to CAMIS site codes, which accounts for 66 million square footage or state facilities or 85% of the energy usage across the AEP facility portfolio.

This doubles the number of mapped sites compared to the start of the AEP in Q1 2012.

MA ZNEB Task Force - Getting to Zero



“A zero net energy building is one that is optimally efficient and, over the course of a year, generates energy onsite, using clean renewable resources, in a quantity equal to or greater than the total amount of energy consumed onsite...”

...even by 2030, achieving the zero net energy performance goal may be infeasible for some buildings, but the broader objective should be to reduce energy loads to the minimum practical level, produce onsite as much as the required energy as reasonable from renewable resources, and purchase locally generated renewable energy to satisfy remaining needs.”

Sustainability Facts

- Goal is to reduce GHG emissions by 30% below 2000 levels by FY2010 and 60% reduction by 2012.
- Energy Conservation:
 - ECMs completed in 2009 are saving 972,740 kWh or approximately \$134,000 per year.
- Renewables:
 - Since 2002, saved 34,550,739 kWh of electricity as a result of biomass conversion project.
 - PV array of 179 individual panels is expected to contribute up to 122,000 kWh annually.
- Only known Associate of Science in Energy Management Degree program offered in Northeast region of U.S.



TZNE Best Practices

1. Assign the Right Team (Right People and Team Size)
2. Define ZNE Goals and Align with Existing Conditions
3. Get Buy In at ALL levels
4. Establish Integrated Processes
5. Incorporate Innovative Solutions
6. Ensure “Right Timing” of Retrofits
7. Manage Post-project Operations

Some of the TZNE “Just Do Its”

Planning

- Conduct or review facility condition assessments and capital plans
- Develop Owner’s Project Requirements and then Basis of Design documents
- Target deep energy ECMs (technical potential) and plug load reduction (with occupant behavior modification)

Integrated Team

- Define integrated team structure and qualified members
- Develop stakeholder engagement plan

Innovative technology

- Use “AEP Current List of Innovative Technology”
- Include training of facility managers on innovative technology

Post Project Operations

- Hire energy performance management firm to keep site at high performance (energy data management and reporting)
- Train facility staff to monitor and adjust energy systems

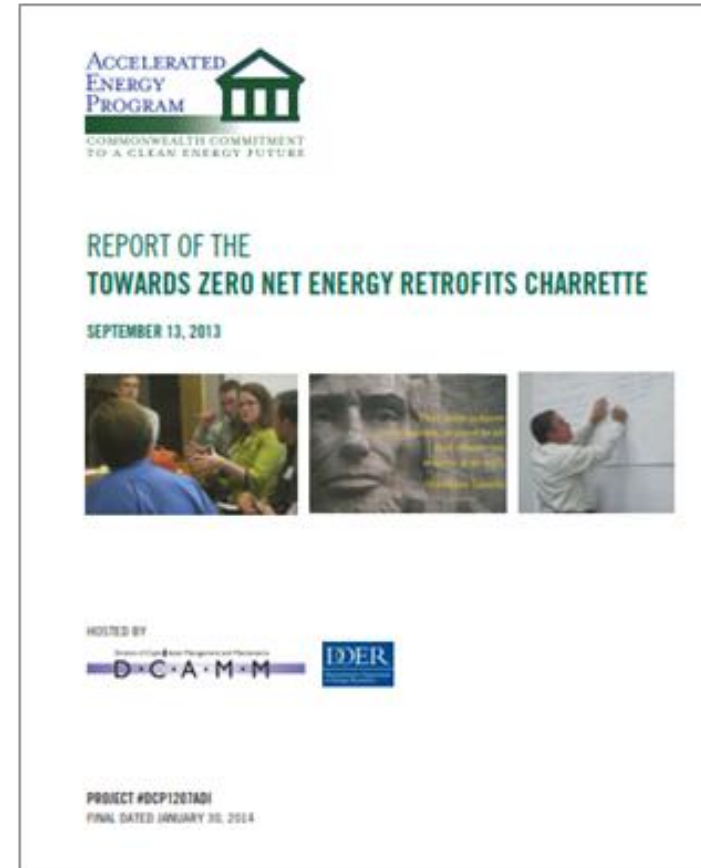
TZNE Charrette Report

The AEP hosted a 4-hour charrette in Q3 2013 to identify how to implement Towards Zero Net Energy (TZNE) Retrofits as an integrated team with clarity on specific changes needed by all members.

The team of 74 participants:

- developed a list of best practices from prior ZNE projects,
- brainstormed challenges, and
- identified changes required to implement TZNE projects at DCAMM.

The team finalized the report which was distributed.



The TZNE Retrofits Charrette Report provides 7 best practices and changes required by team members to implement TZNE on DCAMM projects.

Piloting TZNE Retrofits

The AEP preliminarily identified 11 sites to pilot TZNE retrofits across agencies. Actions are being identified for each project based on their specific dynamics and current implementation status.

Cape Cod Community College	Remaining
Fitchburg State University	Audit Complete
Holyoke Community College	Audit Underway
Greenfield Community College (New Review)	Audit Underway
Berkshire Sheriff's Department	Construction
Essex Sheriff's Department (Lawrence and Middleton)	Procurement
Georges Island	Audit Underway
Job Center New Bedford	Initiated
Lancaster Complex	Remaining
North Central Correctional Institute	Construction
Soldiers' Home Chelsea	Initiated



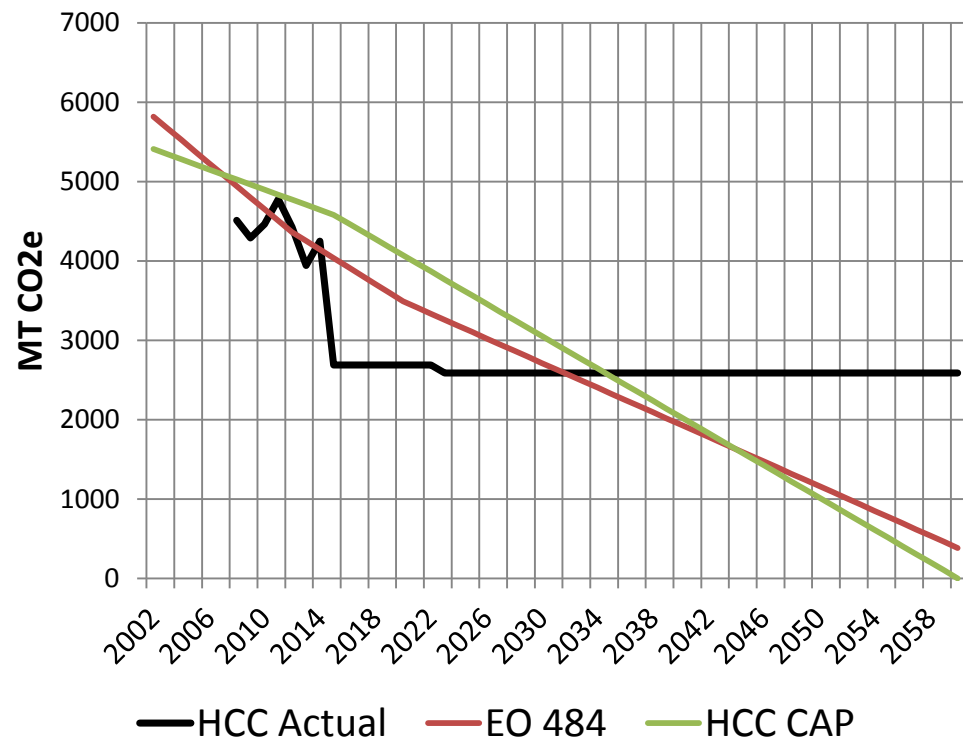
Holyoke Community College Progress towards CAP Goals.

The black line represents the HCC CAP path with current Energy Conservation Project. Very good, but will not get HCC to CAP Goals.

Other strategies that will help:

- Behavior Modification
- Occupant generated strategies
- Plug load reduction
- Ongoing Retro-commissioning
- Other Renewable energy sources
- New Innovative Technologies

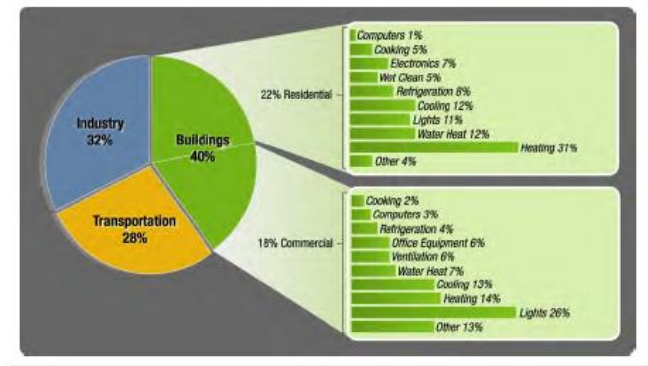
Holyoke CC GHG Path



Energy Conservation Project Approach

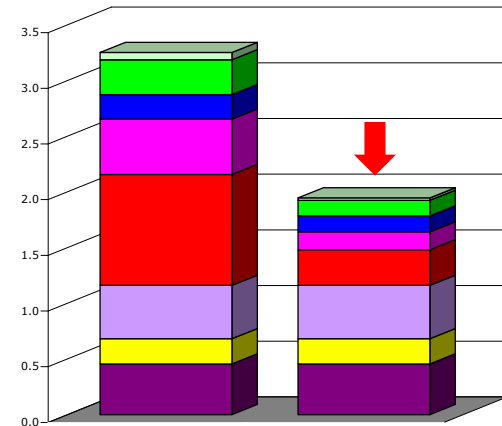
- Identify Potential ECM's
 - Provide Energy Savings
 - Improve Occupant Comfort
 - Improve System Reliability
- Review ECM's
 - Energy Savings
 - Energy Cost Savings
 - Simple Payback or Life Cycle Costing
 - Constructability
- Identify Potential Utility Rebates
- Identify ECM's which payback over the prescribed period of time
- Generate Design Documents

40% of U.S. Primary Energy Consumption



Source: 2007 Buildings Energy Data Book. Tables 1.1.3, 1.2.3, 1.3.3

Energy Consumption by Category
(% Reduction)



Goals for the AEP Workforce Program



Goal 1: Assure that the incumbent and emerging employee workforce in all occupational categories is able to quickly meet the workforce needs of AEP contractors and subcontractors.

Goal 2: Help AEP contractors and subcontractors meet diversity hiring goals for minority workers (15.3%) and female workers (6.9%).

Goal 3: Help AEP contractors and subcontractors meet M/WBE participation goals for design contracts (17.9%) and construction contracts (10.4%).

Goal 4: Coordinate AEP workforce strategy with those of DCAMM overall, and the state's Integrated Facilities Management initiative.

Case Studies of Successful M/WBE Partnerships

“**Beyond Compliance**” is an occasional series of case studies examining the strategies used by contractors and M/WBEs to create successful partnerships and exceed M/WBE participation goals.

Beyond Compliance: Case Studies of Successful M/WBE Partnerships from the Accelerated Energy Program

Beyond Compliance is an occasional series of case studies examining the strategies used by contractors and Minority and Woman-Owned Business Enterprises (M/WBE) to create successful partnerships and exceed M/WBE participation goals.

Accelerated Energy Program (AEP)

The AEP was launched in January 2012 to accelerate the implementation of energy and water projects across the Commonwealth and help meet the goals of Executive Order 484. As part of the AEP, the Division of Capital Asset Management and Maintenance (DCAMM), in coordination with the Department of Energy Resources and partner state agencies, will retrofit 700 sites in the state, encompassing thousands of buildings.

Northern Essex Community College (NECC) Comprehensive Energy Services Performance Project (Haverhill and Lawrence)

On January 29, 2014, DCAMM Commissioner Carole Cornelius joined a crowd of leaders, staff, faculty and students at Northern Essex Community College to celebrate the first large project completed as part of the AEP. The completed energy efficiency measures will save NECC an estimated \$400,000 a year.

General Contractor: Enterprise Equipment Corporation (EEC)
The general contractor for the NECC project was Enterprise Equipment Corporation of Weymouth, Massachusetts. Enterprise's portfolio encompasses all facets of mechanical work. The Enterprise team exceeded the project's 10.4% M/WBE participation goal through the following subcontracts:

- \$305,890 to MBE Carl-Louis & Company of Dorchester for installation of newly mechanical equipment;
- \$140,000 to WBE Spindle City Insulation of Fall River for insulation on newly installed pipes and duct work;
- \$109,851 to WMBE Maria Fallon Electrical Services of Woburn for wiring of electrical control systems;
- \$93,948 to MBE W.S. Anderson of Brockton for work on lighting upgrades.

NECC Project Facts

Location: Haverhill and Lawrence campuses (two Massachusetts gateway sites)
Construction Cost: \$5.9 million
Annual Savings: \$350,000
Energy conservation measures implemented at NECC include:

- Conversion from electric heating to natural gas
- Premium efficiency boiler installation
- Hot water boiler replacement
- Demand control ventilation installation
- Energy management system (EMS) upgrades

Photos (top to bottom): Northern Essex Community College, Herb Corbitt, Vice President for Construction at Enterprise Equipment, and W.S. Anderson workers.

Other AEP LWD Activities

- Workforce Advisor 2014 Meeting (*March 7, 2014*)
- Contractor/seeker online matching resource
- AEP “trainee” career development program



AEP Workforce Advisor 2013 Meeting

Thank you!

We greatly appreciate your time, guidance & feedback.

Next Meeting is **May 9**, 2014

LBE Clean Energy Grant Project Highlights

UMass Amherst – Inlet Cooling Tower for CHP System



- Total Project Cost: \$1.7 million
- LBE Grant: \$387,000
- Inlet cooling tower for natural gas CHP system
- Projected annual savings:
 - \$48,882
 - Reduction of 1,488,000 kWh
 - Increase of 153,413 therms natural gas
 - 815 tonnes GHG



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Quinsigamond Community College - Solar Thermal

- Total Project Cost:
\$61,201
- LBE Grant: \$38,300
- Solar thermal pre-heat
for natural gas boiler
- Provide 70% of hot water
demand for
Administration Building
- Projected annual savings:
 - 665 therms natural gas
 - 3.5 metric tonnes GHG



Massachusetts Water Resources Authority - Hydro

- Total Project Cost: \$577,620 (hydro facility only)
- LBE Grant: \$288,500
- 59 KW hydro facility using raw water from MWRA's Chicopee Valley Aqueduct
- Produce 447,000 kWh per year, enough to power the treatment facility, saving \$50,000
- Provide consistently cold, reliable, and high quality water to DFW hatchery downstream
- Reduce DFW hatchery electricity use associated with pumping by 1 million kWh per year

George's Island Energy Study – AEP

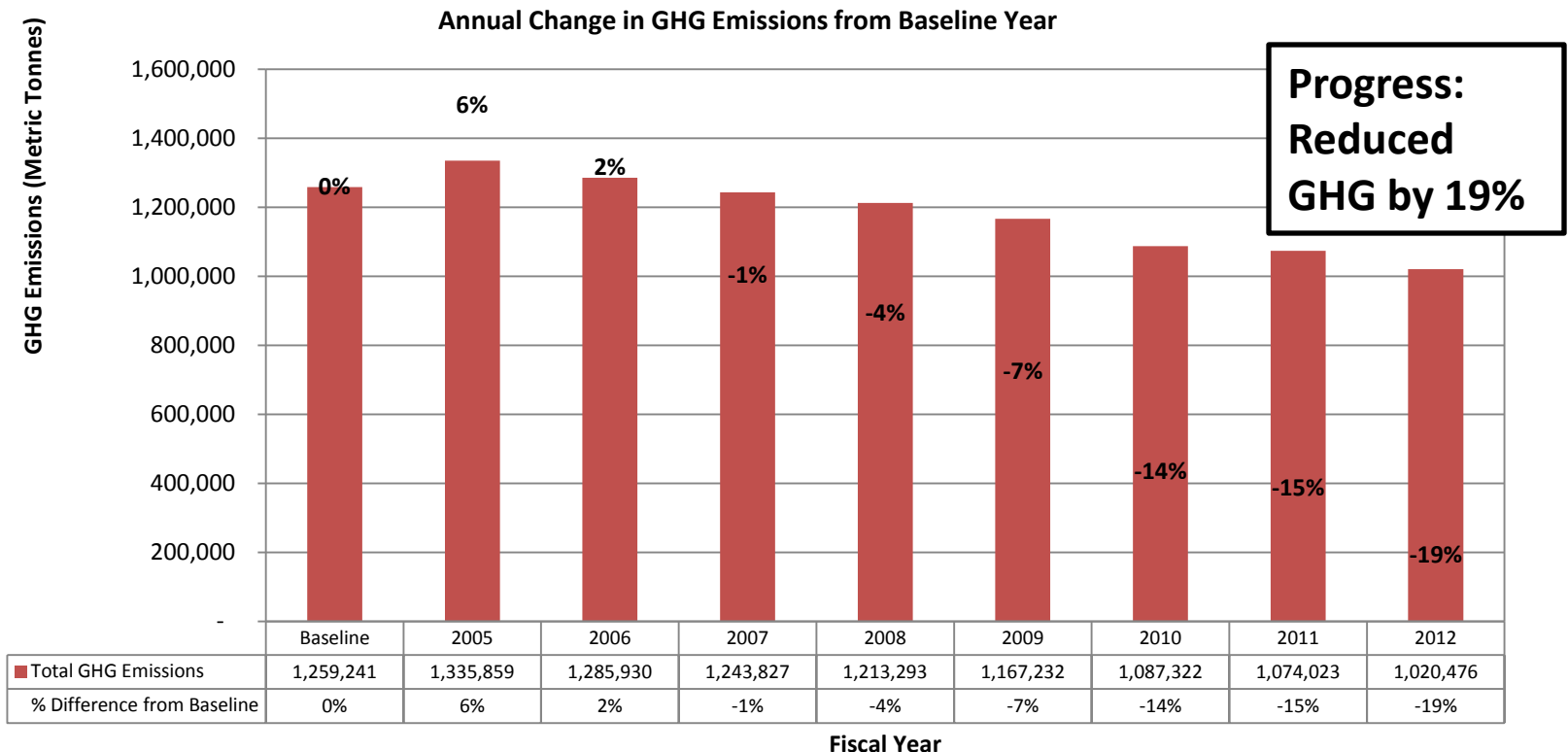
Zero net emissions comprehensive study, looking at:

- Energy and water efficiency
- Solar PV
- Small-scale wind
- Energy storage using PV, Hydrogen, fuel cells
- Anaerobic digester
- Tidal/wave power

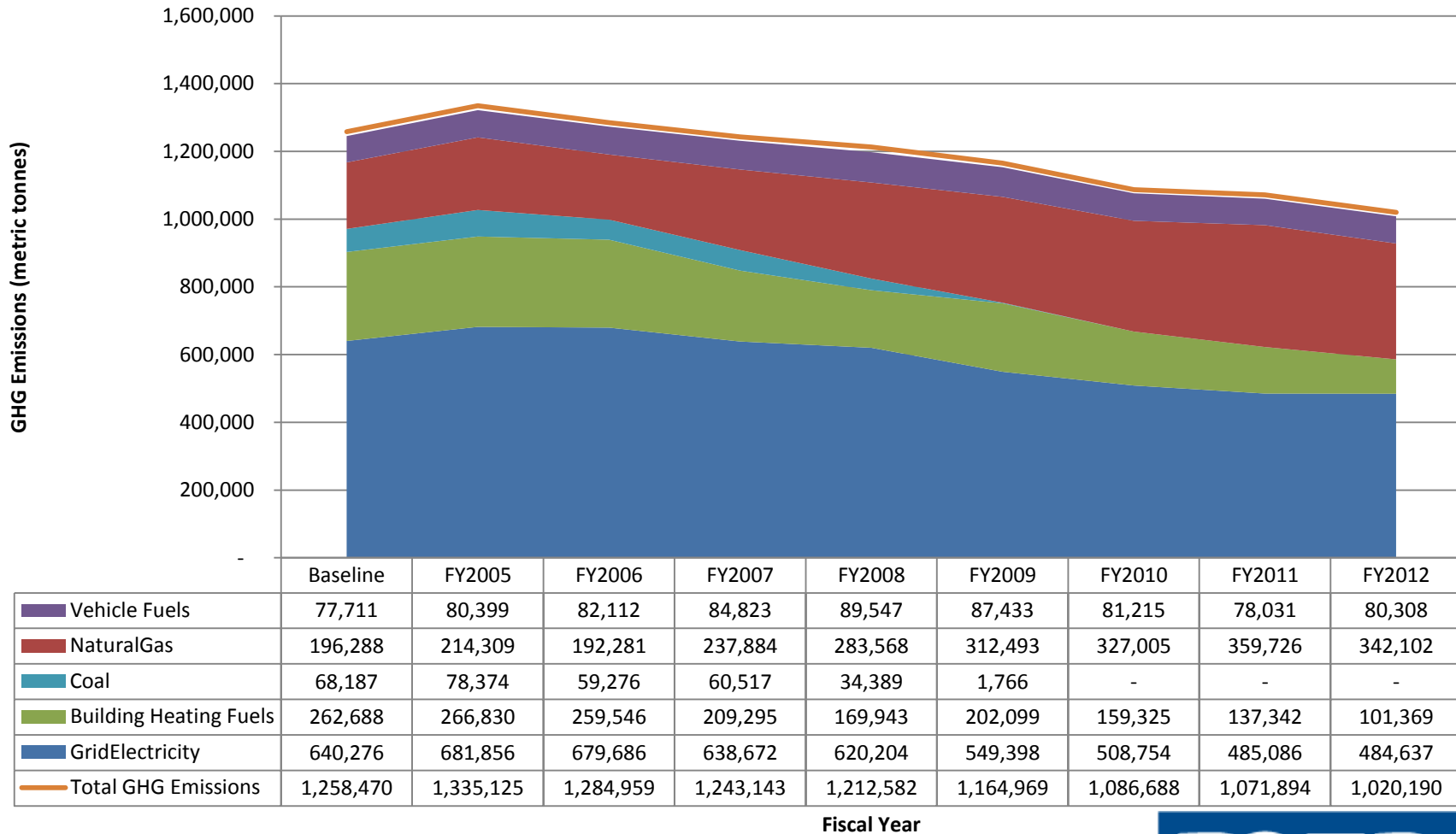


LBE Progress: GHG Progress

Target: Reduce GHG emissions 25 percent by 2012, 40 percent by 2020, and 80 percent by 2050.



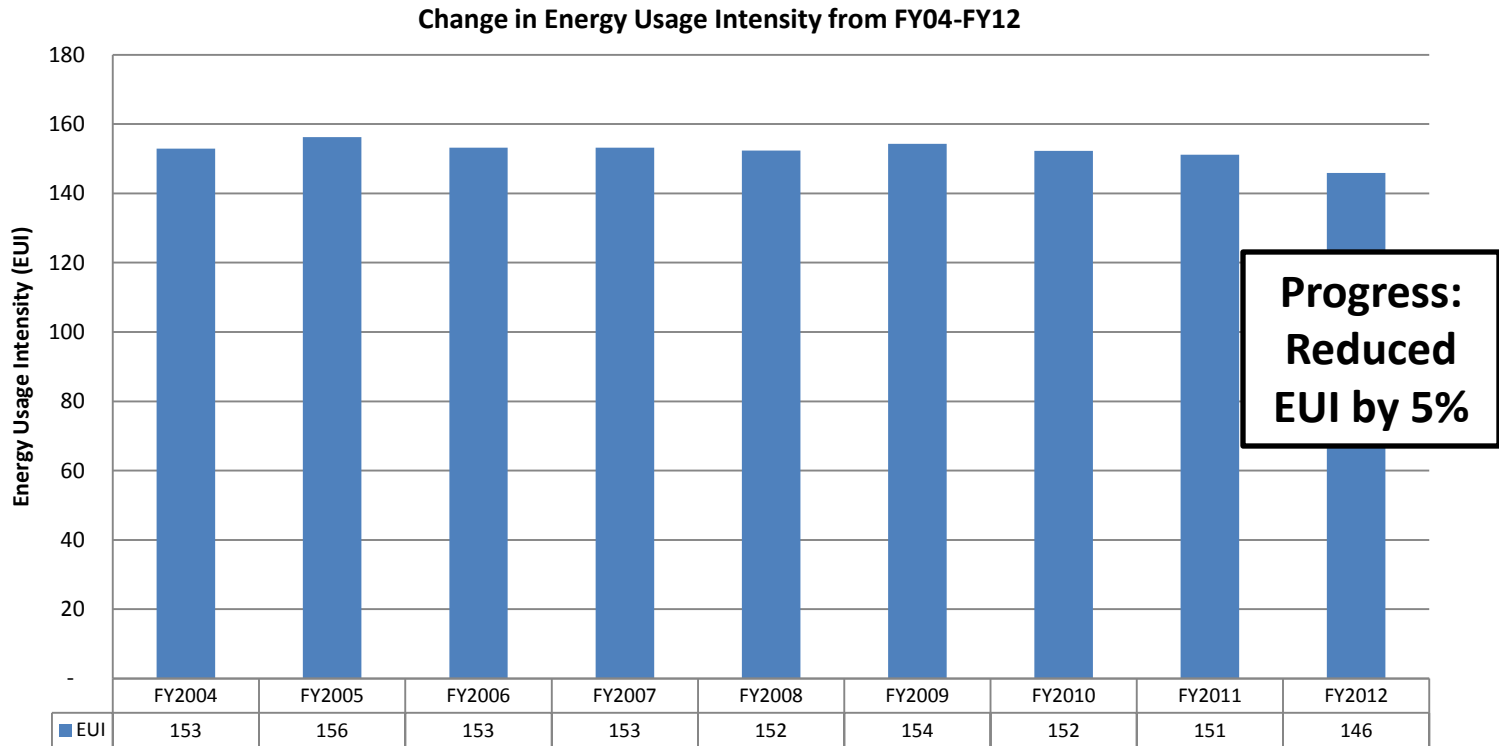
Change in GHG Emissions by Fuel



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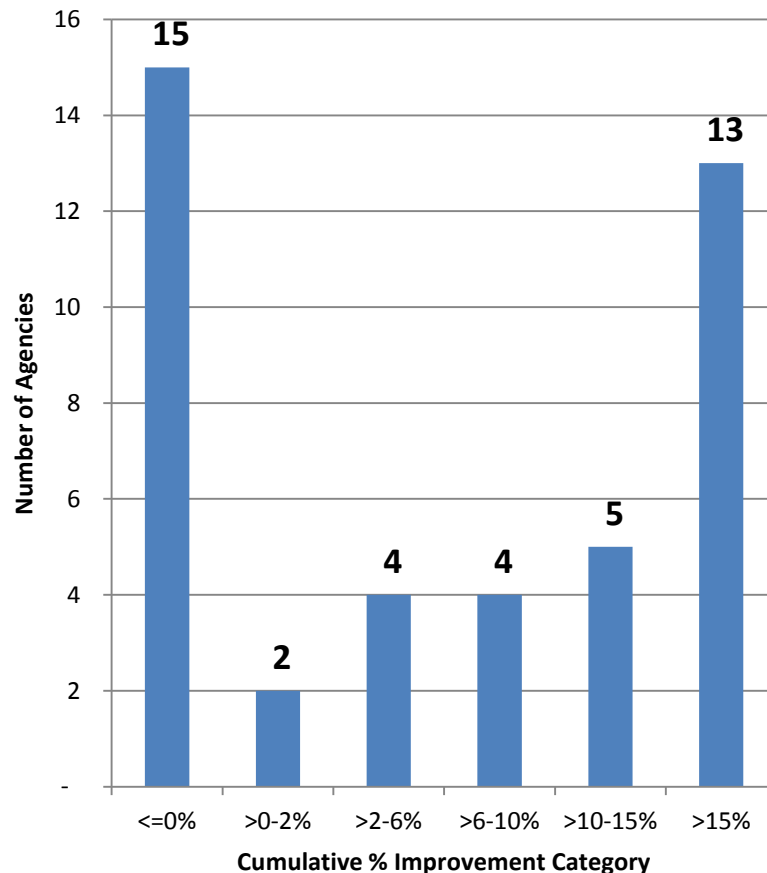
LBE Progress: Energy Usage

Target: Reduce energy use (normalized by weather and square footage) 20 percent by 2012 and 35 percent by 2020

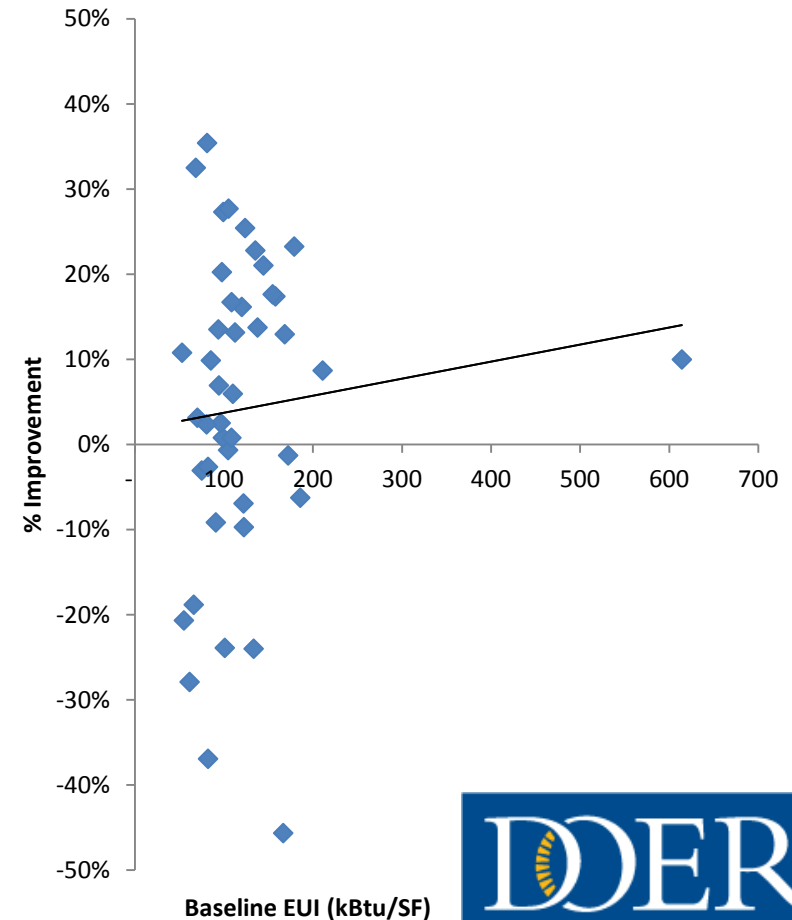


Agency Level Changes in EUI

Number of Agencies by
Cumulative Percent
Improvement



Percent Improvement vs
Baseline EUI



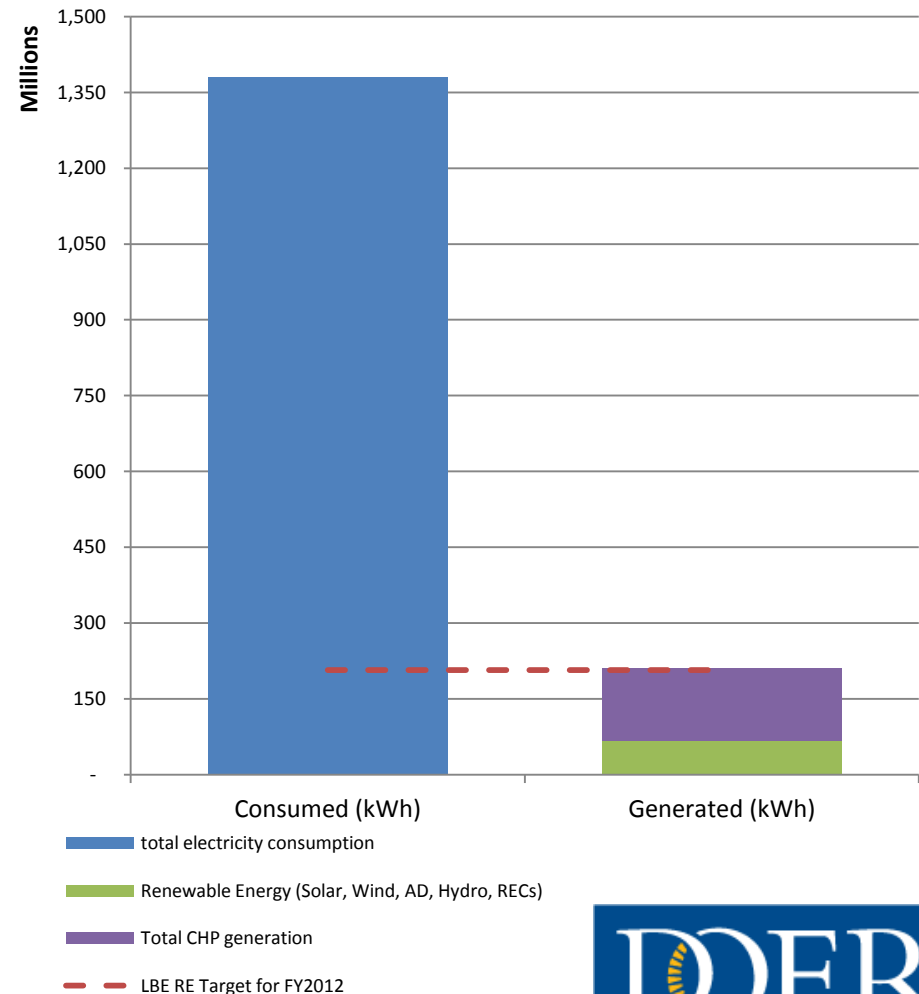
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LBE Progress: On-site Generation

Target: Obtain 15 percent of total electricity consumption from renewable sources by 2012 and 30 percent by 2020

- 1.3 billion kWh total electricity consumption
- 210 million kwh from renewables and CHP
- 1.09 billion kWh from grid
- Total non-grid electricity = 15%

EO 484 Target FY2012: Percent On-Site Generation vs Total Consumption

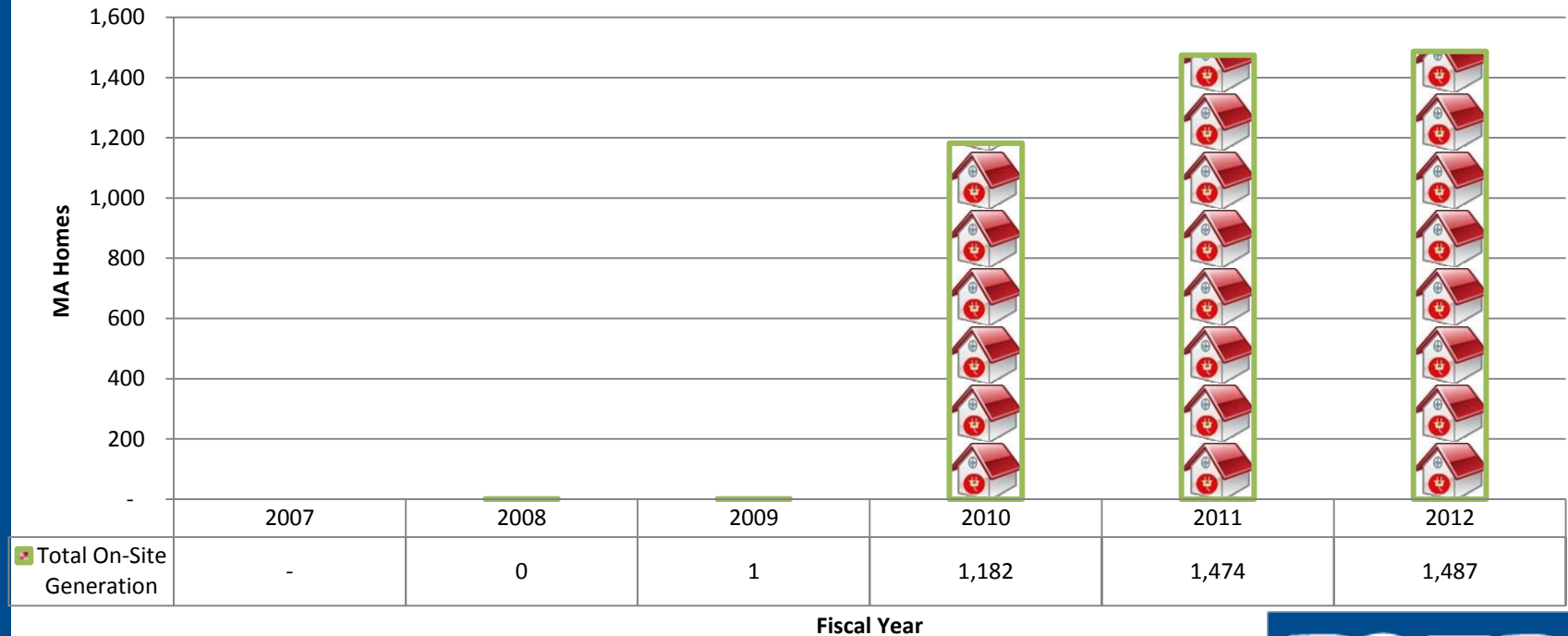


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Renewable & Onsite Generation: DOC

For DOC, 18 percent of their electricity consumption came from renewable and on-site generation in FY12, equivalent to powering 1,487 typical MA homes.

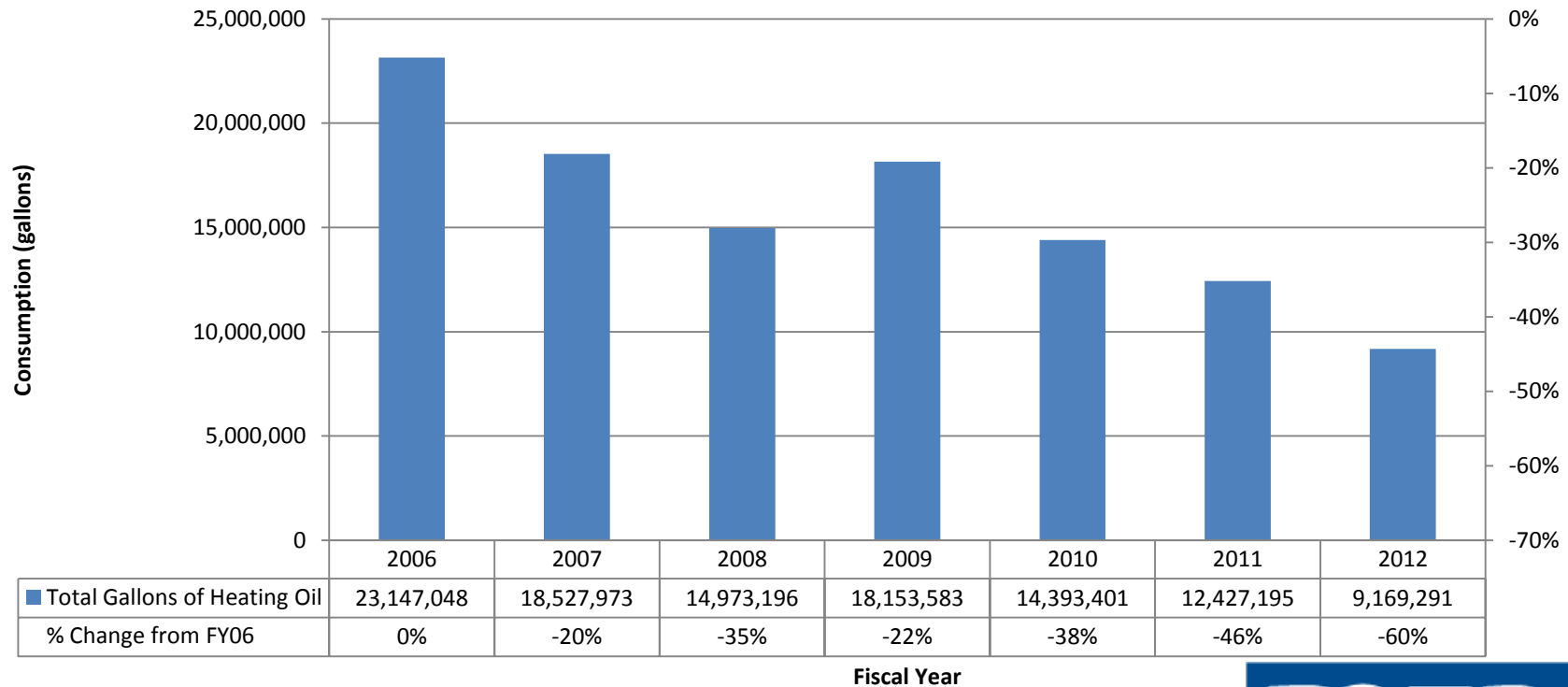
DOC: Equivalent MA homes powered through on-site electricity generation since FY2007



Heating Fuel Oil Progress:

A 60% reduction in heating oil consumption has been seen at state facilities since FY2006.

Overall Heating Oil Consumption from FY06 to FY2012

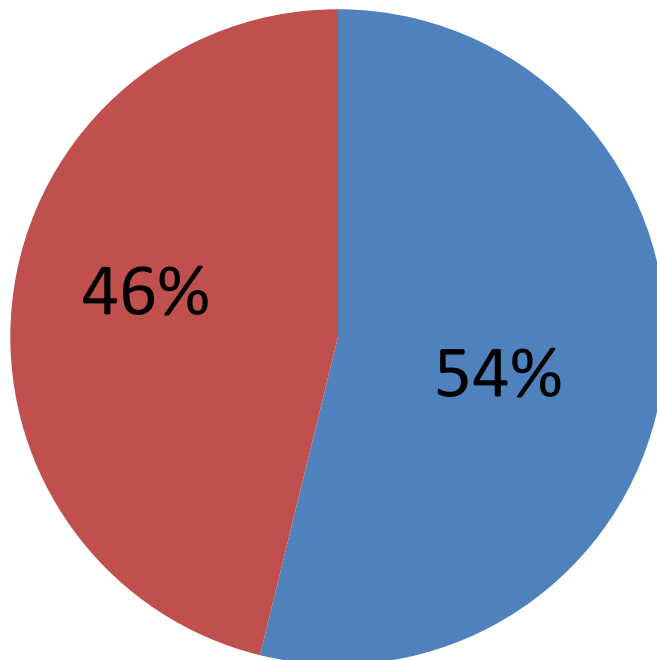


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Heating: Natural Gas & Oil

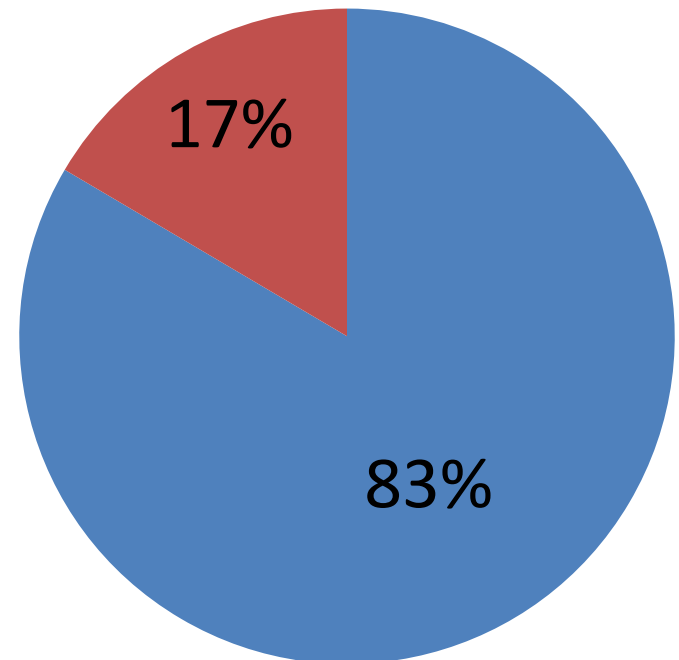
Natural Gas vs Heating Fuel Oil
in kBtu, FY06

■ NaturalGas ■ Heating Fuels



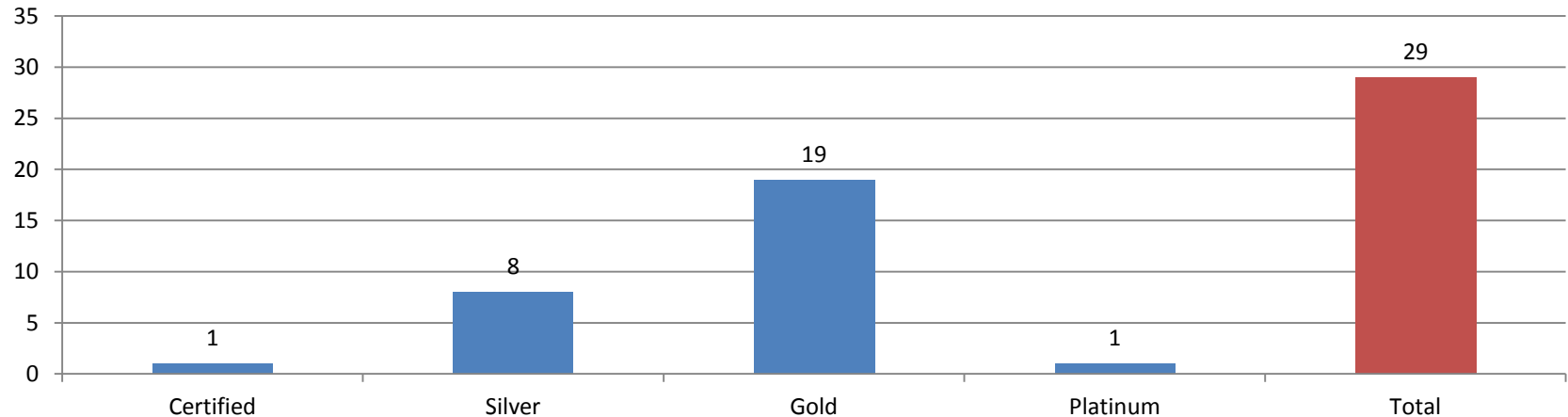
Natural Gas vs Heating Fuel Oil
in kBtu, FY12

■ NaturalGas ■ Heating Fuel



LEED Certified Buildings

Massachusetts State Government LEED Certified Buildings through 2013



Agencies with LEED Certified Buildings	
Bridgewater State University	Dept. of Fire Services
Bunker Hill Community College	Mass. Maritime Academy
Cape Cod Community College	MassPort
Dept. of Mental Health	Military Division
Dept. of Youth Services	North Shore Community College
Fitchburg State University	Salem State University
Framingham State University	Trial Court
Greenfield Community College	UMass Amherst
Mass. College of Art & Design	UMass Medical School
MassDEP	Worcester State University

NESEA Product Highlights

Solaire Solar Carports



NESEA Product Highlights

Massachusetts Wood Products

www.thecqp.com

- Mulch, chips fencing
- Dimensional Lumber
- Millwork, cabinetry, furniture
- Beams, flooring, molding, siding,
- Wood energy



DDER

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Creating A Cleaner Energy Future For the Commonwealth

NESEA Product Highlights

ShowerStart hot water saving device

- Reduces water to a trickle once hot water flows
- User operated to return shower to normal flow
- Fits onto existing systems
- Dormitories, gyms



Middlesex Community College – Ground Source Heat Pump

- Total Project Cost:
\$324,113
- LBE Grant: \$75,514
- GSHP system will provide
~99% of building's
heating and cooling
needs
- Projected annual savings:
 - \$6,524
 - 27,695 kWh
 - 5,392 therms natural gas
 - 28 tonnes GHG

